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Exercises Prescribed During Lockdown Period as a Preventive Measure against COVID-19 - An Overview



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ABSTRACT

Today the whole world is facing a pandemic attack of COVID-19. It started in December 2019, in China. Many nations are facing economical and medical crisis because of spread of COVID-19. Even the developed countries where there are sophisticated health care facilities are facing death tolls. As a result of this pandemic attack, many countries have implemented a lockdown in their nations as the World health organization has declared the COVID-19 outbreak as a global health emergency. Due to lockdown, all parks, gyms in many nations have shut down in order to maintain social distancing and crowdedness. People started staying indoors to prevent the risk of spread of COVID-19. This article describes the various home based indoor exercises that can improve stamina and boost up the immunity during this lockdown period. The practice of home based indoor exercises can reduce the severity of impact by COVID-19 among the population.



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INTRODUCTION

The Corona virus Disease COVID-19 is a viral infection and was declared as global health emergency by the World health organization on 30th January 2020[1,2]. It causes severe acute respiratory syndrome as by coronavirus 2(SARS-CoV-2) [3]. The viral attack was first started in Wuhan, Hubei province in China in December 2019. As per World Health Organization WHO statistics, as on April 06, 2020, there were more than 12,70,000 cases of COVID-19 [4]. Worldwide and approximately 69,400 deaths. The virus usually spreads due to close contact and by small droplets during sneezing, or coughing or talking. [5,6].The contamination can also be caused due to touching contaminated areas and objects then touching risk areas i.e face, nose, eyes etc. The common symptoms include fever, cough and dyspnoea [7].

The recommended preventive measures include regular hand washing, covering one's mouth & nose when coughing and social distancing. Self -isolation is the best way to prevent the transmission of this disease. Many countries have made efforts to prevent the spread of infection by travel restrictions, lockdown, curfew, workplace hazard controls, social isolation and closure of crowded places like malls and educational institutions [8].

As a result of this pandemic attack, many countries have implemented a lockdown in their nations as the World health organization has declared the COVID-19 outbreak as a global health emergency. Due to lockdown, all parks, gyms in many nations have been shut down in order to maintain social distancing and crowdedness. People have to stay indoors to prevent the risk of transmission of COVID-19. There is high prevalence of inactivity due to lock down and curfews.

The long term physical inactivity is a major risk factor for many diseases and premature deaths [9]. Several studies have pronounced that inactivity and poor nutrition are the actual causes of death [10]. Physical inactivity can lead to premature ageing, obesity, cardiopulmonary diseases, musculoskeletal fragility and depression. These problems are usually termed under an umbrella word "disuse syndrome" [11].

A study by (C.M.Bopp et.al 2010), have concluded that the increasing levels of physical activity can have beneficial effects on viral load in infected subjects [12]. A study by (Thomas. J. Cieslak et.al 2003), on effects of physical activity, body fat and salivary cortisol

on mucosal immunity in children, revealed that reduced physical activity and excess body fat can result in higher upper respiratory tract infections [13].

Dr. Jeffrey A. Wood and his team in an experiment on mice found that exercise had a protective effect on mortality due to influenza [14]. Indoor home exercises can be performed to maintain physical fitness and avoid airborne coronavirus [15]. The main benefits of these are not limited to only improving physical stamina, but to enhance ventilatory effort, balance, cardiopulmonary endurance, flexibility.

The advantage of these home based indoor exercises is that they can be performed without any sophisticated equipment to require a minimal space and doable in isolation.

Exercise 1: VIPARITA KARANI WITH CHAIR (Fig 1)

PROCEDURE: While lying supine on the floor with hip and knee flexed to 90° supported with chair against the gravity. Maintain this posture for 5-10 min and concentrate on your breathing during the whole posture.

Advantages: Improves the blood circulation, lymphatic drainage of upper part of the body which enhances immunity.

Precaution: Patients with Glaucoma, Hernia, and uncontrolled hypertension should take necessary precautions during this exercise.

Exercise 2: - SHORT INDOOR BRISK WALK (Fig 2)

Procedure: Walk indoors by swinging your arms during walking within your home, rooftop or balcony for 5 minutes at regular intervals.

Advantages: Maintains healthy weight, prevent or manage various conditions including cardiopulmonary problems, type-2 diabetes, strengthens musculoskeletal system, elevates mood, improves balance, coordination and immunity.

Precautions: patients with Elevated blood pressure, cardiomyopathy, valvular heart diseases, complex ventricular ectopy and uncontrolled metabolic diseases should do walking with proper precautions and under medical practitioner guidance.

Exercise 3:- ASSISTED FISH POSE (Fig 3)

Procedure: Sit on the floor or mat in long sitting position. Place a pillow or bolster just at the back of you. Slowly lower your back and shoulders onto the bolster. Straighten your arms out to the sides. Note that your hips should be on the mat or floor. Close your eyes and concentrate on your breathing for 3 min.

Advantages: Improves chest wall mobility and strengthens the respiratory system.

Precautions: Patients with recent head injuries, increased intracranial pressure, uncontrolled hypertension, low backache, Lumbar disc disease should take necessary precautions before doing this exercise.

Exercise 4: COBRA POSE (Fig 4)

Procedure: Lie on your stomach on floor or mat. Engage your abdominal muscles by drawing your navel up and in towards your spine. Bend your elbows and place your hands down on the mat next to your ribs. Keep your thighs on the ground as you inhale to press into your palms and lift the chest off the ground. Keep a slight bend in your elbows while squeezing the shoulder blades together. Hold this pose for 5 breaths, and then slowly lower back down. Repeat the procedure for 5 times a day.

Advantages: Stretches the muscles of shoulder, chest and abdomen thus improving the ventilatory efforts and capacity, decreases stiffness of the lower back, strengthens the arms and shoulders, increases flexibility, invigorates the heart, elevates the mood and have immunity.

Precautions: Patients with recent shoulder or arms injuries, osteoporosis, advanced sciatica or cervical spondylosis should perform this exercise with precautions and under strict medical practitioner guidance.

Exercise 5: TREE POSE (Fig5)

Procedure: Stand in stride standing posture that is your feet should be hip-width distance apart. Make a Namaste Pose with your palms in front of your chest and engage your abs. Shift your weight on to the right foot and slowly lift the left foot off the ground and on the back of right calf muscle or inner thigh. Gaze to a point in front of you to maintain balance.

Hold this position for 5-8 breaths and repeat by changing the legs. Repeat this exercise 5 times a day.

Advantages: Tress pose stretches the muscles of the thigh, groin and shoulders. It builds tone in the abdomen muscles, calf and shoulders.

Precautions: Patients experiencing headaches, insomnia, low blood pressure, dizziness, vertigo should perform this exercise with caution and preferably with medical advice.

Exercise 6: MOUNTAIN POSE (Fig 6)

Procedure: Stand on your toes and take your hands above the head and stretch the whole body in the upper direction. Breathe in and out with control for 2 min.

Advantages: Stimulates nervous system, improves body balance and posture, strengthens the abdominal and gluteal muscles, and improves the function and capacity of respiratory and digestive systems.

Precautions: Patients experiencing headaches, insomnia, low blood pressure, dizziness, vertigo should perform this exercise with precautions.

Exercise 7: CHAIR POSE (Fig 7)

Procedure: Try to sit on an imaginary chair with raised arms. Concentrate on your breath and maintain this posture for 2 min. Repeat for 5 times a day.

Advantages: Stretches the shoulders and chest, tones up the digestive system and cardiopulmonary system.

Precautions: Patients with Lumbar disc disease, spondylosis, osteoporosis, hip arthritis and knee arthritis should do this exercise with precautions.

Exercise 8: MODIFIED SUKHASANA (Fig 8)

Procedure: Sit on floor or mat with folded legs. Extend the sides of the body and lift the spine. Now lift the arms above head and slowly place them behind the back on the floor. Maintain this pose for 10 breaths and repeat for 5 times a day.

Advantages: Improves flexibility of upper spine, allows optimal breathing and movement of "prana"(life force energy) throughout the body.

Precautions: Patients with shoulder injuries, low back pain, cervical spondylosis, knee arthritis should do this exercise with precautions.

Exercise 9: BRIDGING (Fig 9)

Procedure: Lie straight on your back on floor or mat. Bend your hips and knees with feet flat on the floor. Raise your buttocks off the ground and straighten your spine while placing the arms at the side of the body. Maintain this posture for 10 breaths. Repeat for 10 times a day. Do not use a pillow while performing this exercise.

Advantages: Strengthens the muscles of the lower limbs, paraspinal muscles, and chest, relaxes the whole body, reduces anxiety, improves the digestion, and relieves insomnia.

Precautions: patients with neck pain, low back pain, knee injuries, and shoulder injuries should perform this exercise with precautions.

Exercise 10: BILATERAL SIDE STRETCHES (Fig 10)

Procedure: Sit towards the front of a chair with your legs wide, knees and toes pointed out. Place your right hand on the right thigh and lift the left arm towards the ceiling. On an inhale reach straight up then exhale to side bent over to the right. Hold for 5 breaths and repeat the same on other side.

Advantages: Chest expansion, improves chest mobility, improves ventilation.

Precautions: patients with neck pain, low back pain, and shoulder injuries should perform these exercises with precautions.

Apart from the above exercises, the following breathing exercises shall be beneficial in improving ventilator capacity and efforts.

Exercise 11: ANULOM VILOM (Fig 11)

Procedure: Sit in sukhasana or padmasana with spine straight. Using the right thumb, block the right nostril and inhale through the left nostril for 2 seconds. Now block both nostrils and hold the breath for 4 seconds. Repeat the same with opposite nostril. Repeat for 10 rounds.

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Advantages: Helps in relieving anxiety and depression, warm up the body before doing other exercises, helpful in treating respiratory problems and high blood pressure.

Precautions: Cardiac patients, hypertensive patients and pregnant women should not hold their breath while performing this exercise; they should just keep inhaling and exhaling.

Exercise 12: PURSED LIP BREATHING (Fig 12)

Procedure: Sit in Sukhasana or Padmasana with spine straight. Relax shoulders as much as possible. Now inhale through your nose for 2 seconds, feeling the air move into your abdomen. Now purse your lips (Make a small opening in the mouth) and exhale twice as long as you breath in. Repeat for 10 rounds.

Advantages: relieves shortness of breath by slowing the breath rate, keep the airways open for longer time, decreases work of breathing, improves ventilation.

Precautions: Cardiac patients, hypertensive patients and pregnant women should not hold their breath while performing this exercise; they should just keep inhaling and exhaling.

Exercise 13: DIAPHRAGMATIC BREATHING EXERCISE (Fig 13)

Procedure: Lie straight on your back on floor or mat with a pillow under the knees and head. Place one hand on the upper chest and the other just below your rib cage. Breathe in slowly through the nose so that your stomach moves out against your hand. The hand on the chest should remain as still as possible. Repeat for 10 times.

Advantages: It helps in strengthening the diaphragm, decreases work of breathing, and decreases the oxygen demand.

Precautions: patients with bronchial asthma, chronic bronchitis, reflux gastritis, recent rib or chest injuries should perform this exercise with care.

Exercise 14: HUFFING

Procedure: Sit straight with chin tilted slightly up and open your mouth. Take a slow deep breath and hold for 2-3 seconds. Now, exhale forcefully but slowly continuously such that the mucus moves from smaller to larger airways. Repeat the cycle for 4-5 times.

Advantages: Clears the airways, moves the mucous from smaller to larger airways, assists in chest clearance and improves ventilation.

Precautions: Patients with uncontrolled hypertension, Glaucoma and pregnant women should not hold the breath.



Fig: 1 to 13 Demonstrating various exercises

DISCUSSION

The above mentioned exercises during the lockdown period because of COVID-19 outbreak, shall be beneficial in improving the ventilation, vital capacity of lungs, perfusion -diffusion, clearing the chest secretions, improving the immunity and prevents mental depression and anxiety.

The respiratory system is the most affected by COVID-19. The Exercises having a definite postures like Tree pose, Viparita Karani with chair, cobra pose shall improve the absorption of oxygen by tissues, strengthens the lungs and heart, regulates the blood pressure, nervous

system, supports the healing process and improves the resistance to infection [16]. It is observed in many studies moderate physical activities improves recirculation of immunoglobulins, anti-inflammatory cytokines, neutrophils, NK cells, cytotoxic T cells, and immature B cells, all of which play an important role in immune defense activity [17-20]. The Fish pose exercise described above helps in absorption of nutrients and helps in effective breathing [21]. The Cobra pose relieves stress, elevates the mood, aids in kidney functions and opens up heart and lungs.[21].

The forced expiratory exercises like huffing where there is a combination of one or two forced expirations and periods of breathing control helps in mobilization of secretions from smaller airways to larger airways [22]. The Principle behind this technique is equal pressure point (EPP), which is described as the point at which pressure within bronchi equals peribronchial pressure during a forced expiration [23]. During expiration the EPP starts at the mouth and moves peripherally towards the lobar and segmental bronchi thus mobilizing the secretions. Often, the COVID-19 infected clients suffer from shortness of breath. The Pursed lip breathing which is a simple exercise can be performed to improve the breathing. This exercise decreases the symptoms of dyspnea and rate of breathing. It aids in releasing the trapped air in the lungs, promotes general relaxation and keeps the airways open for a longer duration [24]. The lung functions and trunk stability can be promoted through diaphragmatic respiration. The diaphragmatic respiration is performed by diaphragmatic contraction [25,26]. The diaphragmatic breathing exercise improves SPO_2 Levels and vital capacity [27]. The Anulom Vilom is an effective breathing technique which improves the vital capacity and maximum ventilatory volume. This exercise also improves VO_2 MAX in the individuals. Anulom Vilom improves lung functions by releasing lung surfactant and prostaglandins into the alveolar spaces which increases lung compliance and decreases bronchial smooth muscle tone [28]. The bilateral chest stretches causes a stretch on thoracic wall and respiratory muscles which causes improvement in the chest wall mechanics and enhances chest mobility and respiratory efforts [29]. Thus, with the above mentioned facts and theories, it is evident that home based indoor exercises shall be beneficial in preventing physical inactivity during the lockdown.

CONCLUSION

COVID-19 is a rapid spreading pandemic worldwide with high mortality rate. Social distancing is the best measure identified to prevent the spread of this infection. As many countries have been affected by this pandemic, few of them imposed lockdown to prevent transmission. During lockdown the people stay indoors and resulting with minimal physical activity, which may lead to other health problems & depletion in immunity. Hence simple home based indoor exercises as described above would be beneficial in improving the immunity as well as preventing the ill effects of inactivity.

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